

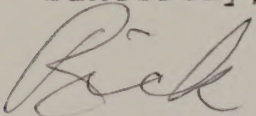
2 May 1984

Dear Harold,

I enclose copies of the protocols for the 2 experiments that we discussed while I was in Weslaco. Since I will have to do some experimenting in developing a method to carefully remove the crop of flies (having been frozen in liquid nitrogen), I am beginning these tests at once. All tests should be completed by 15 May when you arrive for the technical meeting.

Please let me know just as soon as Raúl has located and examined the chromatograms for the specimens collected 9-26 May 1984³.

Sincerely,



R. J. Brenner

encls.

cc: O.H. Graham

*enclosure filed
under
Research Goals 1984*

For: Ann. Entomol. Soc. Am.

Please send proofs to:
Dr. O. H. Graham
Screwworm Research
P.O. Box 267
Weslaco, TX 78596

05/05/84

this version to
area 0

DISTRIBUTION OF SCREWWORMS (DIPTERA: CALLIPHORIDAE)
RELATIVE TO LAND USE AND TOPOGRAPHY IN THE
HUMID TROPICS OF SOUTHERN
MEXICO

¹
Richard J. Brenner

¹
USDA-ARS, Screwworm Research, P.O. Box 267, Weslaco, TX 78596, USA,
present address: USDA-ARS, Insects Affecting Man and Animals Labor-
atory, Gainesville, FL 32604, USA.



COMISION MEXICO-AMERICANA PARA LA ERRADICACION DEL GUSANO BARRENADOR

LA ENERGIA ATOMICA AL SERVICIO DEL GANADERO

COMTA. 24963

KM. 2 CARRETERA A LA ANGOSTURA

APDO. POSTAL 544

CHIAPA DE CORZO, CHIE.

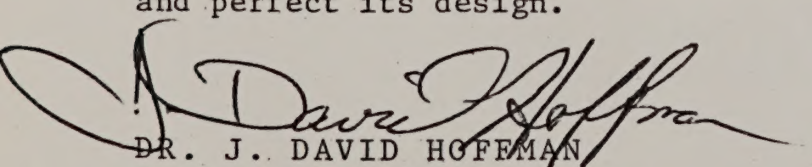
RECEIVED MAY 09 1984

May 8, 1984

Subject: Weekly Report. Methods Development.

TO: DR. RONALD E. LOWE
Sub*Director of Production.

- * Few eggs masses being collected in the A-82 field test site. No sterile flies are being released.
- * Methods is in contact with Drs. Cajero and Novy (by radiogram) regarding - - options to delay or begin sterile fly releases. Plans are to initiate sterile fly releases as soon as possible unless otherwise directed.
- * Methods is concerned that unchilled pupae shipped to Ocozocoautla may over heat in bulk awaiting packaging. Methods will make an onsite review soon.
- * Most (27) of Methods plant personnel were assigned to strike force duty April 30 to May 2, 1984.
- * Methods programs were not affected by the strike.
- * VF-84 colonization in Methods' Strain Change Program is progressing very well. Methods has set 1 cage per day (with 6 liters/cage) as of April 24, 1984 with 1st. generation pupae reared by Methods. Currently, 1 cage per shift is being set. (as of May 4, 1984).
Fecundity is extremely good; 100 g for 1st oviposition and close to 200 g after the 2nd. oviposition. Larval weights average 65-75 mg. VF-84 is in the F₃ generation. Dr. David Taylor (ARS) estimates it will require 3-5 more generations to obtain full recombination of the iso-female lines. VF-84 will be available for field testing about the end of May-1984.
- * The fluorescence test is progressing, and is in the pupal stage now (larvae fed media with acridine orange). Full report to follow when test is completed.
- * The "Flow-Through Vat" concept is being bioassayed and looks very promising. Methods will be conducting continuous bioassay studies to evaluate its potential and perfect its design.


DR. J. DAVID HOFFMAN
Chief of Methods Development.

cc. Dr. Hugh Graham.- ARS
cc. Dr. David Taylor.-ARS
CC. Files.

RECEIVED MAY 3 0 1984

FOREIGN TRAVEL REPORT

Traveler: William Schultz, USDA Western Regional Research Center,
800 Buchanan Street, Albany, CA 94710, U.S.A.

Country: Mexico, 05 - 15 May 1983.

Purpose: Visit screwworm (Cochliomyia hominivorax) facilities at Mission, TX
and Tuxtla Gutierrez, MEXICO.

Summary:

As a visitor, I was looking for key process relationships in screwworm production to contrast with my prior housefly-medfly experience, plus screwworm acquaintance.

If viewing fly rearing as metabolic sequences within the Order Diptera, then both commonality and differences exist in mass-rearing ease and specialization. This is progressive through the housefly : medfly : screwworm : tsetse fly. Further, a field metabolic "key" is not necessarily a process "key" of the same priority when rearing under artificial conditions. A 50% mortality appears in the medfly and screwworm larvae which reduces yield from a production view, but which may be essential for perpetuating a good selection from an insect view. A 90% pupation and maturation yield appears to be good production efficiency, but this stage may be a more critical unit operation because the pupae are immobile and cannot migrate to a more desirable environment as can larvae. Medfly- and screwworm-pupae thermodynamics appear similar. This may also be fundamentally true for the larvae though the diets would appear to mask the similarities.

The visit raised interesting questions as to whether the field insect considers the ARS lab rearing, APHIS methods development, and APHIS production as metabolically equivalent, or whether the screwworm is merely adapting? And, whether the indoor rearing-environmental differences are significant to the screwworm product through successive generations? During the visit, pH and temperature measurements at the larval and pupal stages. Possibly, some of the differences will be worthy of an in-depth consideration. Perhaps too, directly controlling the process on the temperatures and pH's of larval-clusters and pupae could be considered further.

Such questions are best answered by the local ARS-APHIS-SARH personnel who are very capable and can monitor the insect product (consequences), rather than by a visitor who only sees fleeting, academic differences, then disappears-into-the-night.

Overall, the Tuxtla Gutierrez screwworm mass-rearing is a successful operation controlled by knowledgeable personnel, and the visit was both a pleasure and an informative privilege.

General:

This trip was an orientation on screwworm mass rearing as formerly practiced at Mission, Texas and as now performed at the joint SARH-APHIS facility near Tuxtla Gutierrez, Mexico. It included discussions with field, production, methods development, research, engineering, and quality-control personnel. Temperature and pH measurements were made on larvae and pupae for further information.

Preceding this visit, screwworm rearing had been discussed briefly with W. Klassen (then of ARS-NPS). He suggested considering *Phormia regina* as a screwworm model, similar to the housefly I previously used as a innocuous fruit-fly model in Albany.

As pre-trip preparation, I locally collected blowfly eggs (*Phaenicia*) on fresh beef liver and reared these through pupation. Differences in rearing behavior between the housefly and blowfly were noted, and used as a question base. This rearing also suggested minor instrumentation to take on the trip.

The first stop was a one-day visit to the APHIS facility at Mission, Texas on Friday, May 6th. Though now on standby status, it did provide both a contrast and historical view to the present Tuxtla operation. This included discussions with John Spencer, Robert Mangan of ARS and Tom Lefler, Joe Raimariz, and W. Sudlow of APHIS.

Arriving in Tuxtla Sunday morning May 8th, the day was spent with Hugh Graham (ARS-RL) and acquainting with the production-facility exterior. Each weekday I spent about four hours inside the screwworm facility, then had Saturday to sum my notes before leaving Tuxtla on Sunday and returning to San Francisco the same day, May 15th.

Hugh Graham arranged the visit at an excellent time when a variety of people were in town, both the regular full-time staff APHIS-ARS and other key people who are normally based in part or solely elsewhere, such as H. Charpentier, N. Meyer, C. Hoffman, F. Smith, R. Reichard, R. Harris, etc. In addition to Hugh Graham, a variety of local men were most helpful: J. Mackley, E. Gersabeck, D. Hoffman, R. Peterson, R. Brenner, R. Lowe, C. MacVean, S. DeCorso, I. McKey, and others.

My perspective and background differs from most personnel associated with the screwworm program because it was originally industrial bio-processing and only recently insect rearing. Therefore, this commentary is written as an amateur among professionals, but having mutual interests and experiences when the insect is viewed as a series of biochemical reactions. Such commentary is made with the reminder to the reader that Tuxtla is a most successful operation, and making changes for academic interest do not necessarily lead to significant improvements.

The measurements taken during the visit were likely no different than others have done. Some of that data is shown with commentary. These comments are not meant as direct suggestions, but rather are an out-sider's view that possibly might raise a meaningful question or two that will could be elaborated with the excellent talents and the in-depth experience of the local staff.

Larval-Diets and Room Temperatures.

1. Temperatures were measured with a 0.060-inch diameter SStl shielded type-K thermocouple probe coupled to a digital meter, indicating to the nearest 0.5°C. On a macro basis, and viewing Tuxtla as a large production facility, there were little temperature differences in particular areas, i.e. often less than 1°C.

On a micro basis, the differences were not so much in the liquid-diet vats or various parts of the room, but between the interior and exterior of a larval cluster. In contrast to housefly and medfly larvae which are grown in a solid diet, the temperature differences in the screwworm diet vats appear insignificant (external to clusters); hence, the need for management of heat generated within the liquid diet is negligible. Also, there seems a major contrast in the apparent lack of microflora growth within the screwworm diet as compared to houseflies and medflies under mass-rearing conditions. The major question may be to ask what is a significant temperature difference on a micro-basis -- hence to what precision should the temperature be controlled through room-heat management, i.e. -----

What should be the larval-cluster temperature?

And, is that cluster temperature requirement being met?

2. Around the perimeter and through the aisles, there are differences, such as between the center and perimeter. The nature of the liquid diet lends itself to a self-adjusting temperature control. As a future consideration if going to a gelled or other non-flow liquid, attention might be required to the reduced mobility of waste material, artifacts, and cluster heat. This heat (a quantitative factor) is mentioned as an entity to be "managed" so as to control the temperature (an intensive factor). Such a change could have a "cascade-effect" and require modification to the room air-conditioning load and distribution because the self-leveling evaporative (latent) cooling of the liquid diet would not be present. In such a situation, consideration could be given to equalizing the cluster temperatures in the top and bottom trays.

Note: These temperatures (see Table) were taken "once-a-day"; they are neither averages nor ranges which would reflect the true situation and the degree to which the factory rearing predisposes the screwworm quality.

Pupation and Pupae-Maturation Temperatures.

The pupation and maturation takes place in hardwood sawdust. The mass density of mass-reared screwworms is much greater than for wild insects. Hence, the opportunity exists for greater deviations in temperatures (7°C), particularly due to the heat of pupation (see Table)

Subsequent to this visit to the screwworm facility, I was able to do some brief investigation of medfly pupal heats. The temperature history of young pupae appeared to alter the responses of more mature pupae. Since pupae are immobile and cannot seek their preferred environment, as do adults and larvae, the pupa stage may offer future opportunities.

pH of the Larval Liquid Diet and Larval Clusters

Measurements were made to about 0.2 pH units using narrow-range pHdrion indicator paper to obtain a general pH profile throughout the diet pan. Differences in pH appeared to have potential biochemical significance, probably as others have previously investigated. As these pH differences are indicative of the reactions, they might be periodically reviewed as a simple check on the production well being. Undoubtedly the basic questions were answered years ago when the screwworm liquid diet was developed, but changes occur due to minor production-methods alterations.

ARS Lab Rearing ----- APHIS Methods Development ----- Factory Operation.

At the time of the visit, "apparent" differences in the three rearing methods were observed, but I was not able to distinguish between which were significant and non-significant differences in rearing environment, i.e. the human view of the in situ "averaged" macro-environment provided the screwworm versus the actual micro-environment the insect inhabits.

Likely, the observed differences are insignificant because when talking with ARS and APHIS personnel in December (ESA meeting in Detroit, Dec 1983), I understood that the 1983 screwworm strain was still propagating well and that field efficacy was excellent.

Liquid diet -- APHIS factory replaces the liquid 7-3-3 (% blood-milk-egg) diet every four hours while ARS rearing and selection uses larvae migration. These are potentially different micro-environments.

Egg Hatch -- APHIS factory at 39°C room air versus ARS 38-40°C water bath. The humidity differences, and effect with time on egg case integrity is a potential difference.

Pupal handling -- From heat rates and temperature profiles I made on medfly pupae from pupation through maturation, the subsequent pupae thermal-response (metabolic activity) appeared to be readily disturbed. After thermal disturbance, it appeared that the pupae repeated part of the prior profile; these were "stray" observations in some preliminary work, but indicated that further work would be worthwhile. This impinges on the measured differences in pupal micro-environment (see Table).

Housefly -- nil housefly contamination in the ARS facility; significant housefly presence in the factory. No particular speculation on the significance.

Future -- If factory mass-rearing screwworms is viewed as a relatively new industrial technique (compared to silkworm), then we will see these skills progress from the present mix of empirical and theoretical techniques toward more detailed theory. Particular value seems to be offered by periodically reviewing practices with respect to the physico-chemical micro-environments rather than depending on averaged macro-environments. Therefore, from a thermal view, I consider the critical points to be the larval-cluster and pupal temperatures from larvae through imago. A fuller view should include the chemical constituents because minor changes in production methods can create major changes in the metabolism.

LARVAL LIQUID-DIET TEMPERATURES [°C] (10 May 1983/prox 1030 hrs)												AIR TEMPERATURES [°C]			
ROOM	GRP	LARVAE AGE (days)	LOCALE (*horiz position in pan, **vertical position in diet)									IN AISLES BETWEEN GRP ROWS A-B at 1-m ht	VERTICALLY BETWEEN PAN CENTERS GRP #5 Stacks		
			*	PAN CENTER			PAN QUARTER			PAN EDGE					
			**	Btm	Mid	Top	Btm	Mid	Top	Btm	Mid				Top
1st	-	0.12		29	29	30	--	31	--	31	30	32	--		
	-	0.75		33	33	33	--	--	--	35	--	34	--		
2nd	-	1.46		34	34	34	--	--	--	35	--	35	--		
Main	#01	2.33		37	--	38	--	--	--	33	--	33	34		
	#02	2.67		34	--	--	34	--	--	34	--	31	34.5		
				--	--	--	--	--	--	--	--	36w.	--		
	#03	3.00		35	--	35	--	--	--	36w.	--	37w.	34.5	Above	
				--	--	--	--	--	--	33	--	32	--	Pan 5++	34
	#04	3.33		33	--	32	--	--	--	35w.	--	35w.	34.5		4-5 34
				--	--	--	--	--	--	33	--	32	--		
	#05	3.67		34	33	32	--	--	--	38w.	--	38w.	34		3-4 34
	#06	4.00		35	35	34	34	33	33	33	33	32	34		2-3 34
	#07	4.33		33	32	32	--	--	--	32	--	30	33		
	#08	4.67		34	33	33	--	--	--	32	--	31	33.5		1-2 33
														Under	
#09	5.00		31	31	30	--	--	--	31	--	30	35	Pan --1	32	
#10	5.33		30	30	30	--	--	--	31	--	31	34			
#11	5.67		--	--	--	--	--	--	--	--	--	34.5			
#12	0.00		--	--	--	--	--	--	--	--	--	34			

w. = Larval cluster; otherwise, liquid only or nil larvae.

Group #11, Matts hanging; no liquid diet; larvae being harvested; pans mty.

#12, New larvae being added; no measurements taken.

Diet Depth: 1st Initiation, prox 12-mm

2nd Initiation, prox 25-mm

Main Room, Group 1 = 75-mm; 9 = 35-mm

Nominal Rm-Atmosphere Control
(13 January 1983 memo)

1a. Initiation, 39°C x 70% RH

2a. Initiation, 37°C x 70% RH

Incubadora, 35°C x 80% RH

A GRP is composed of A & B (double) Rows running prox west-east.

GRP double rows numbered north-to-south, 10-V-83 sequence was 10-11-12-(01)-02-03-04-05-06-07-08-09, north to south

Temperature measurements replicated May 11th were similar.

Remeasured 1st Initiation 13-V-83@ prox 0.2 days, temps @ Ctr-Btm = 33°; cluster top = 33°; range 30-33°

pH LARVAL-DIET LIQUID

(11 May 1983, prox 1530 hrs)

ROOM	GROUP	PAN Verti Posit'n	LARVAE AGE (days)	LOCALE (*Horiz locale in pan; **vert in liquid)						
				*	(Center)			(Edge)		
					**	Btm	Mid	Top	Btm	Mid
Main Larv	5	3a	3.8		6.4	--	6.4	--	--	7.2w
	5	3b	3.8		--	--	6.8	--	--	7.2w
	5	4c	3.8		--	--	--	--	--	7.1w
	5	4c	3.8		--	--	--	--	--	7.2w
	5	5c	3.8		--	--	6.2	--	--	--
	3	3	3.1		--	--	--	--	--	6.2
	3	4	3.1		--	--	--	--	--	6.4
	3	4	3.1		--	--	--	--	--	6.8w

Liquid Diet before feeding, pH 6.35 +/- 0.2

Random measurements, liq with nil larvae, 6.4, 6.4, 6.8, 6.2, 6.2, 6.4, avg = 6.4
 " " , larv-cluster surface liq, 7.2, 7.2, 7.1, 7.2, 6.8, avg = 7.1

Random re-measure of larvae-cluster surface liquid (13-V-83), range = 6.8 to 7.0

Factory water, 7.6 to 8.0, avg = 8.0

GROUP ROWS (double), A & B

GROUP 11-V-83 sequence 11-12-(01)-02-03-04-05-06-07-08-09-10

Pans (5) numbered Btm = 1, Top = 5.

PUPAE-BED TEMPERATURES [°C] (10 May 1983, prox 1230 hrs)

ROOM	AGE	PUPAE	BED DEPTH	LOCATION IN TRAY											
				HORIZ			CENTER			QUARTER			EDGE		
				DEPTH	Btm*	Mid	Top	Btm*	Mid	Top	Btm*	Mid	Top		
Pupation	0.1	-0-	50		26.-	22.-	19.-	--	--	--	24.5	24.-	20.5		
	0.9	100	25		21.5	21.-	19.-	--	--	--	24.-	22.-	21.5		
Matur'tn	1.1	100	nm		--	--	--	16.-	17.-	16.-	--	--	--		
	5.0	100	nm		--	--	--	17.-	18.-	19.-	--	--	--		

Pupation & Maturation Beds = sawdust, hardwood

Nominal Room-Atmosphere Control

Residence Time, Pupation Room = 24-hours
Maturation Rm = 5.5-days

Pupation 28°C x 50% RH
Maturation 26°C x 70% RH

Remeasured on 13-V-83 in Pupation Room,
Age 0.2 days @ Ctr-Btm = 30°; Ctr-Top = 32°

* Inside of tray at bottom.

05/30/84

SUMMARY REPORT:

Report Summary
1984 Annual Livestock Insects

NOT FOR PUBLICATION

Workshop Session: Grubs, Bots and Screwworms

Title: Status of the Screwworm Eradication Program

Author: Richard D. Peterson II

Affiliation: USDA-AR Screwworm Research
Metabolism and Radiation Research Laboratory
Fargo, North Dakota

Summary:

The screwworm eradication program continues to make steady progress toward the barrier in southern Mexico. Highlights of the 1983 effort include total reported cases of 5,835 compared to 17,991 cases in 1982. The state of Coahuila was declared free of screwworms on November 11 making it the fifth Mexican state declared screwworm free. In September, the critical line was moved to the 20th parallel and on December 1, moved to the 19th.

In 1984 (January thru April), there had been 1,300 reported cases in Mexico compared to 3,600 during the same period in 1983. The Region III (Guadalajara) packaging and distribution center, which oversaw the problem areas in the state of Michoacan and surrounding states, is being phased out. All efforts are now being concentrated in the last zone, Zone V (Ocozocuatla/Villahermosa) which includes the barrier. A quarantine line of 30 inspection stations has been established along principal road and rail agricultural routes. Most efforts, however, will be directed toward the 3 stations in the barrier zone. Coumaphos at 0.25% spray or 0.06% dip will probably be the treatment applied. Efforts are underway to station Mexican military personnel at the barrier stations to enforce the quarantine. As of May 1, the critical line extended from Veracruz, Veracruz (19 parallel) to Acapulco, Guerrero (100th meridian). It is hoped that by the end of 1984 the critical line can be moved to the 96th meridian which would mean the barrier had been reached.

The reasons for the eradication programs rapid progress are many. The A-82 strain which was developed by ARS during 1981 and put into mass production in October 1982 is still doing the job in the field. This fall a decision will be made whether to keep A-82 or change to Villa Flores-84, the new ARS candidate strain. Both the Commission (USDA-APHIS and SARH) and USDA-ARS have added much needed and better qualified personnel at every level. The ARS contingent has been increased to 7 research scientists.

RECEIVED JUN 4 1984
May 22 1984

Name: RALPH A. BRAM

Title: National Program Leader
Insects Affecting Man & Animals and Parasitology

Dates of Travel: May 14-18, 1984 Location: Mexico City and Tuxtla Gutierrez, Mexico

Purpose of Travel: To review progress of the operational screwworm eradication program; to review the ARS screwworm research program; and to co-chair the annual screwworm research/methods development planning meeting.

Participants/Contacts: P. Murrman, AAD, Southern Plains Area; Co-Directors of the Mexico-American Screwworm Eradication Commission; ARS Screwworm Research Project Leaders and Research Scientists from Tuxtla Gutierrez, Fargo, College Station, and Weslaco; screwworm eradication program personnel in methods development.

Highlights: Screwworm eradication continues to move positively toward the goal of establishing a barrier at the Isthmus of Tehuantepec by December 1984. ARS Research Units at Tuxtla Gutierrez and Fargo, with contributions from Weslaco and College Station, continue to address high priority research needs in the areas of: (1) strain development; (2) field ecology; (3) screwworm attractants; (4) population genetics; and (5) fundamental genetics. An increased research effort on screwworm nutrition and rearing is indicated and, as the program establishes a quarantine line to support the barrier, more information is needed on the chemical control of screwworms. Furthermore, field research in the geographical area south of the intended barrier (Central America) is necessary to characterize the ecology, genetics, and habits such as dispersal of screwworm populations which will attempt to break the barrier or may be subject to future eradication effort.

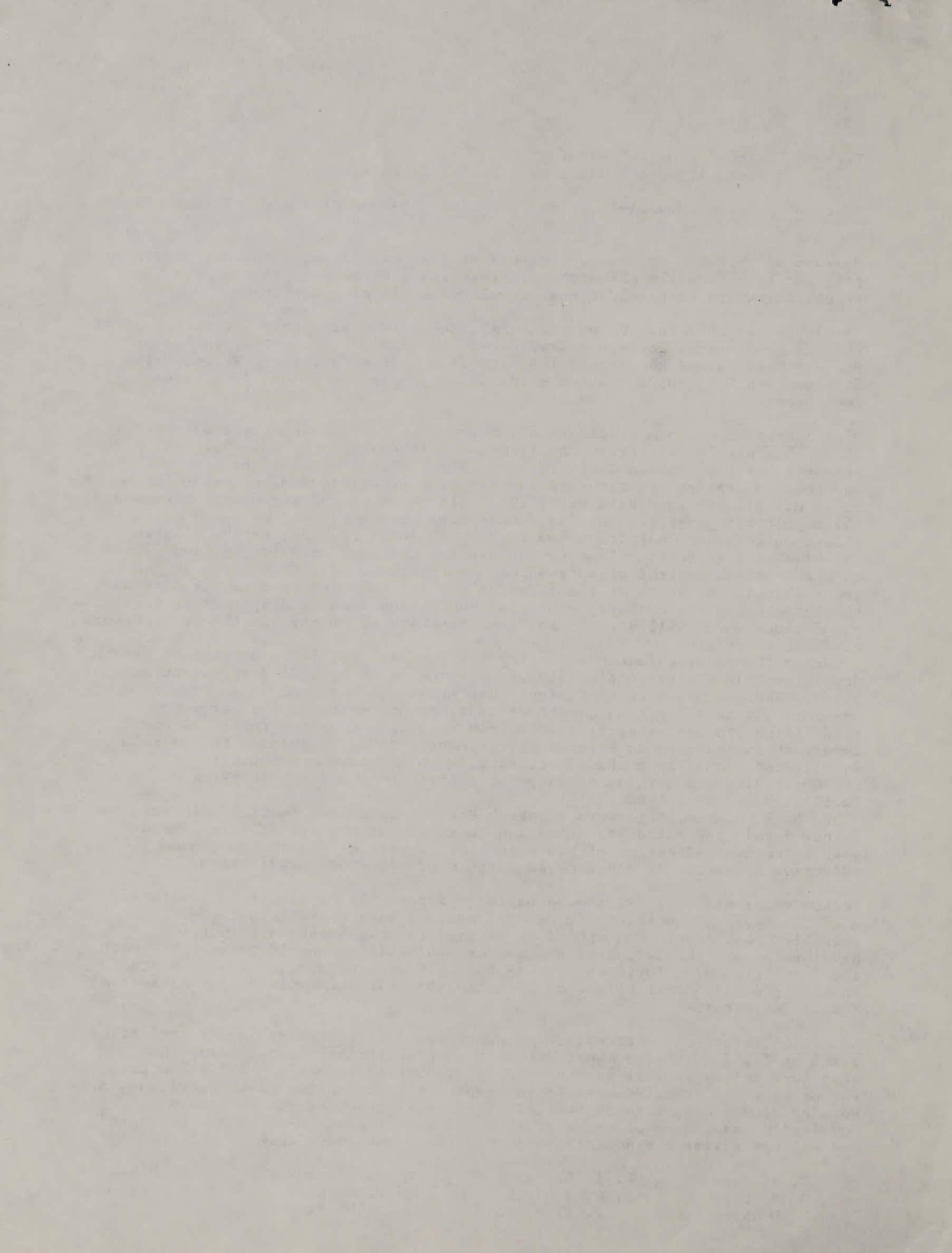
During the research/methods development meeting, the issue of whether strain development is the responsibility of research or of methods development again arose. Whereas ARS scientists feel that strain development is no longer research but is a legitimate methods development function, the screwworm eradication program managers view strain development as too technical and important to delegate to methods development. It is my opinion that strain development should be a shared activity, with ARS having technical responsibility and methods development contributing support in terms of facilities and assistance.

Dr. O. H. Graham, Screwworm Research Project Leader at Tuxtla Gutierrez, has rather firmly indicated his intention to retire at the end of this calendar year. The identification of his successor is critical to the continued effective execution of research in support of screwworm eradication.

Recommendations: (a) ARS should begin to assess the feasibility of establishing a 2 SY satellite laboratory in Central America with emphasis being given to possible locations in Costa Rica or Panama; (b) the question of strain development and the nature of shared responsibilities should be resolved with the initiation of efforts to develop the next strain; and (c) line and staff should intensify their effort to identify the next screwworm project leader at Tuxtla Gutierrez.

Special Observation: Recently, screwworm commission workers in the production plant at Tuxtla Gutierrez went out on a 48-hour strike, jeopardizing the screwworm colony as well as the orderly production schedule. ARS scientists and technicians voluntarily assisted in keeping the production plant operating, many working alternating 12-hour shifts. The co-directors of the Screwworm Commission assured me of their gratitude for this commitment by ARS personnel and will so advise our Administrator by formal correspondence.

cc: T. J. Army	R. F. Barnes	K. L. Lebsock	C. H. Schmidt
D. B. Laster	J. R. Johnston	✓ O. H. Graham	H. E. Brown
D. D. King	P. J. Fitzgerald	C. J. Whitten	



Dennis King
Dept. of Entomology
Texas A & M University
College Station, Texas 77843
May 16, 1984

Dr. O. H. Graham, Leader
Screwworm Research Lab
P.O. Box 267
Weslaco, TX, 78596
Tuxtla Gutierrez, Chiapas, Mexico

Dear Hugh:

I am writing concerning the status of the Chrysomya paper.
I sent it to you over a month ago. Did you receive it?
Have you reread it & if so, what was your decision? If
typing is a problem, I can get it typed here. Please inform
me of the paper's status. Thank you very much.

Sincerely
Dennis King

copy of mss. fwd to Cindy 06/06/84
for retyping —
also see folder w/ previous
mss. in Screwworm Research
drawer —

Dennis King
Dept. of Entomology
Texas A & M University
College Station, Texas 77843
May 16, 1984

Dr. O. H. Graham, Leader
Screwworm Research Lab
P.O. Box 267
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me of the paper's status. Thank you very much.

Sincerely

Dennis King

06/06/84

Dennis

I did receive the revised ms.
and it appears to be much
closer to ready for publication.
It will need to be typed and
unfortunately Josie had resigned
before I received it. There
(over)



COMISION MEXICO-AMERICANA PARA LA ERRADICACION DEL GUSANO BARRENADOR

LA ENERGIA ATOMICA AL SERVICIO DEL CANADERO

COMTA. 24983

KM. 2 CARRETERA A LA ANGOSTURA

APDO. POSTAL 544

CHIAPA DE CORZO, CHIS.

Junio 6, 1984

June 6, 1984

A: DR. HUGH GRAHAM
TO: Director, A.R.S.
Tuxtla Gutiérrez.

Asunto: Colecta de masas de huevecillos para la nueva cepa.

Subject: Collection of Egg masses for new strain.

* El Depto. de Métodos actualmente está realizando sondeos en las áreas de Tizimín y Tzucacab, Yucatán.

* Methods is now conducting pre-test field studies in Tizimin and Tzucacab, Yucatán.

* Hasta ahora, la colecta de masas de huevecillos han sido excelentes en ambas áreas (promediando 1.3 por corral/día) Del 31 de mayo al 5 de junio hemos colectado 73 masas en total en 10 corrales experimentales (5 por área).

* Egg mass collection are very good in both locations (ie. averaging 1.3 per corral per day). We have collected 73 egg masses in 10 experimental corrals (5 per area) from May 31 to June 5, 1984.

* Si lo considera necesario, el Departamento de Métodos se complacerá en cooperar con ustedes para obtener las masas de huevecillos necesarias para iniciar la nueva cepa.

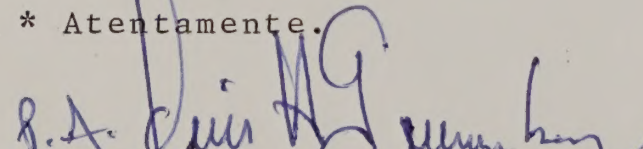
* Methods will cooperate with you to obtain necessary egg masses for initiating a new strain if you wish.

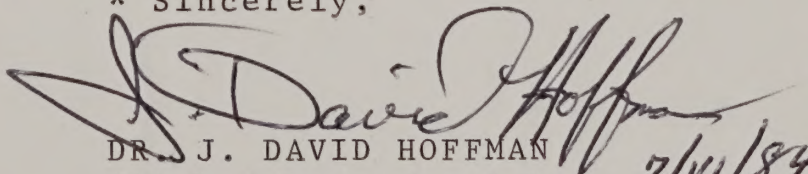
* Favor de hacernos saber su decisión con relación a lo antes mencionado.

* Please let us know your decision.

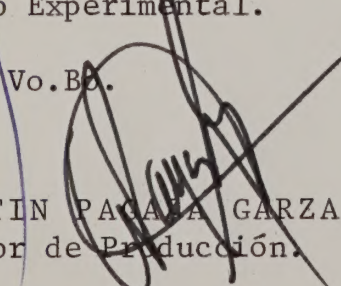
* Atentamente.

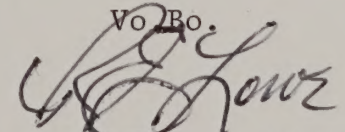
* Sincerely,


DR. ARTURO MARTINEZ Y TAPIA
Jefe del Depto. de Investigación y Desarrollo Experimental.


DR. J. DAVID HOFFMAN
Chief of Research and Exp. Development Department. 7/10/84

Vo.Bo.


DR. AGUSTIN PACALA GARZA
Sub*Director de Producción.


DR. RONALD E. LOWE
Sub*Director de Producción.

cc. Directores Generales.- Ofnas. Centrales.
cc. Sub*Directores Generales.- Ofnas. Centrales.
cc. Entomólogos Asesores.- Ofnas. Centrales.
cc. Entomólogos Asistentes.- Edificio.
cc. Archivo.

7 June 1984

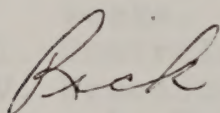
Chris,

Per our conversation of 6 June, I enclose a protocol for testing the fitness of adult screwworms following storage and shipping of pupae in a chilled anoxic state. Bill Rubink and I will be working together on this; he has some good ideas on determining precisely what is going on in the plastic bag, and the data on effect of anoxic storage or low CO2 levels on the metabolism of screwworms may be of value to Bill in his life table work. This will also provide some continuity to the program after I leave, should this test indicate that there is some value to the technique.

If we find that the quality of the flies is acceptable, we propose to further test the effect of prolonged storage of pupae in the chilled anoxic state -- probably through 7 days.

In order to avoid any possible discrepancies between the English and translated-to-Spanish protocol, Bill has already made the translation; this copy is also enclosed.

Sincerely,



R. J. Brenner

encls.

✓ cc: O. H. Graham

PROTOCOL FOR TESTING FITNESS OF ADULT SCEEWORMS

FOLLOWING CHILLED ANOXIC STORAGE AND

SHIPMENT OF PUPAE TO GUADALAJARA

USDA-ARS and Methods Development Section

Submitted by R.J. Brenner and W.L. Rubink, USDA-ARS

Purpose: This study will measure the fitness of adult screwworms that have been subjected to chilled, anoxic storage and shipment to Guadalajara. If this study demonstrates that the quality of the fly is not affected by this method, we propose to define the limitations of this technique by determining the maximum amount of time that pupae can be maintained in a chilled anoxic state without adversely affecting the quality of the resultant adults.

- I. Treatments will consist of:
 - A. 5 liters of chilled pupae in a sealed plastic bag,
 - B. 10 liters " " " " " " " "
 - C. 20 liters " " " " " " " "
- II. Each treatment will be replicated twice per shipment; shipments will be made on Monday, Wednesday and Friday of each week for 2 weeks.
- III. Controls will consist of normal processessing and shipping.
- IV. Procedures
 - A. Following irradiation, pupae will be chilled for a minimum of 3 hours before preparation of treatments.
 - B. For treatments, pupae will be placed in the plastic bags and a knot will be tied firmly in the bag; treatments will be returned to the tray and/or rack.
 - C. For controls, the pupae will be processed as usual for transportation to Guadalajara.
 - D. As bins are loaded into the truck, the plastic bags will be placed within the bins.
 - E. In Guadalajara, standard quality control tests will be performed with the following special conditions:
 1. CHECK EACH BAG THOROUGHLY UPON ARRIVAL TO MAKE SURE THAT THERE ARE NO HOLES IN THE PLASTIC !!
 2. Pupae in each treatment bag should be carefully mixed before the bag is opened so as to thoroughly mix the pupae for random sampling,
 3. Ten random samples (each with approximately 1600 pupae) will be drawn per bag and for the control.
- V. Data will be coded as follows per test:
 - A. S0.5.a.1 through .10 for replicates of first 5-liter bag without oxygen; use S0.5.b.1 through .10 for second bag.
 - B. S0.10.a.1 through .10 for replicates of first 10-liter bag without oxygen; use S0.10.b.1 through .10 for second bag.

- C. S0.20.a.1 through .10 for replicates of 20-liter bag without oxygen; use S0.20.b.1 through .10 for second bag.
- D. 0.1 through 0.10 for the ten replicates of the control.
- E. Send data to:
Dr. R. J. Brenner
USDA-ARS
Tuxtla Gutierrez

EACH PAGE OF DATA MUST SHOW THE DATE OF SHIPMENT OF PUPAE AND THE DATES DURING WHICH THE TEST WAS CONDUCTED!!

PROTOCOLO PARA INVESTIGAR LA CALIDAD DE MOSCAS ADULTAS

DE GUSANO BARRENADOR DESPUES DE ALMACENAJE

ANOXICO FRIO Y TRASLADO DE PUPAS A

GUADALAJARA

USDA-ARS y Sección Desarrollo de Métodos
Propuesto por R.J. Brenner y W.L. Rubink, USDA-ARS

Objetivo: Este estudio medirá la calidad de moscas adultas del gusano barrenador que se han sometido a almacenaje frío, anóxico y traslado bajo estas mismas condiciones a Guadalajara. Si el propuesto estudio demuestra que la calidad de mosca no está afectada por este método, nosotros proponemos definir en otro estudio, las limitaciones de tiempo en que pueden permanecer las pupas sin afectar la calidad de moscas adultas resultantes.

- I. Los tratamientos consistirán en:
 - A. 5 litros de pupas enfriadas y empacada en una bolsa de plástico,
 - B. 10 litros " " " " " " " " " " " "
 - C. 20 litros " " " " " " " " " " " "
- II. Cada tratamiento se repetirá dos veces en cada traslado; los traslados se efectuarán cada lunes, martes y miércoles durante dos semanas seguidas.
- III. Los testigos consistirán en las pupas normalmente trasladadas y procesadas.
- IV. Procedimientos:
 - A. Después de irradiación, las pupas se enfriarán por un mínimo de tres horas antes de la preparación de los tratamientos.
 - B. Para los tratamientos, las pupas serán colocadas en las bolsas de plástico y las bolsas se atarán con un nudo. Los tratamientos serán devueltos a su charola o anaquel de origen.
 - C. Para los testigos, se procesarán las pupas de la manera usual para traslado a Guadalajara.
 - D. Al cargar el camión se colocarán las bolsas en las cajas de pupas.
 - E. En Guadalajara se correrán todos los ensayos de control de calidad usuales, con las siguientes condiciones especiales:
 1. SE DEBE REVISAR CADA BOLSA AL MOMENTO DE LLEGAR PARA VER QUE ESTE INTACTO, SELLADO HERMETICAMENTE, Y QUE NO EXISTAN AGUJEROS EN EL PLASTICO.
 2. Deben mezclarse las pupas cuidadosamente en cada bolsa antes de sacar las muestras.
 3. Diez muestras, al azar, (cada una con aproximadamente 1600 pupas) se sacarán de cada bolsa, y para el testigo también.

- V. Los datos serán codificados de la siguiente manera para cada ensayo:
- A. S0.5.a.1 a .10 para las repeticiones de la primer bolsa anóxica de 5 litros; emplear S0.5.b.1 a .10 para la segunda bolsa.
 - B. S0.10.a.1 a 10 para las repeticiones de la primer bolsa anóxica de 10 litros; emplear S0.10.b.1 a .10 para la segunda bolsa.
 - C. S0.20.a.1 a 10 para repeticiones de la primer bolsa anóxica de 20 litros; emplear S0.20.b.1 para la segunda bolsa.
 - D. 0.1 a 0.10 para repeticiones de testigo.
 - E. Mandar los datos a:
Dr. R. J. Brenner
USDA-ARS

¡CADA HOJA DE DATOS DEBE MOSTRAR LA FECHA DE ENTREGA DE LAS PUPAS Y LOS DIAS EN QUE SE CORRIO EL ENSAYO!



United States
Department of
Agriculture

Agricultural
Research
Service

Southern Region
Southern Plains
Area

Screwworm Research Lab
Apartado Postal #544
Tuxtla Gutierrez, Chiapas
Mexico

June 8, 1984

SUBJECT: Remarks in your Trip Report Concerning
Future Strain Development Activities

TO: Dr. R. A. Bram

As always, your report of your trip to Tuxtla on May 14-18 was a succinct, useful, and interesting account. I especially appreciate your well-balanced, accurate summary of the discussions of future strains and how they are to be developed.

While we in ARS lab at Tuxtla continue to feel that strain development can now be accomplished by following a "cook book recipe" that our scientists would be glad to provide, and that routine strain development is an inappropriate assignment for Category I scientists and perhaps even an improper expenditure of research funds, we fully understand the need for the development of one more strain to be a shared activity. Following this line of thought, I propose that the next strain be developed in laboratory space provided by Methods Development under the technical supervision of Dr. David Taylor. I feel that in addition to providing a scientist to work with Dr. Taylor the Methods group should assign two technicians to work with our ARS technicians. In addition, any and all assistance they can provide for egg mass collection activities would be very helpful (see additional remarks below).

Of the above, the laboratory space is the critical item. We suspended research activities for about 6 months and dedicated our laboratory space to the development of the Villa Flores strain. To repeat that cycle again, and perhaps again and again in the year ahead, very simply means that we cannot have a meaningful research program at this location.

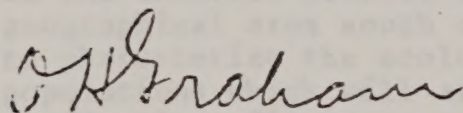
It would mean that we agree to the destruction of our program so that Methods can continue to work with only one strain at a time in their facility. The argument that to rear single female lines inside Methods would endanger the Villa Flores strain is not valid as it presumes that a fertile male from an undesirable line would escape, move from one room to another, somehow enter an adult holding cage, and mate with virgin females of the strain being protected. (It also ignores the lucid explanation of genetic contamination provided by Dr. R. L. Mangan with his memorandum of December 28, 1983, copy enclosed).

I am being told by Commission officials that they need a new, standly strain now because (1) Villa Flores might be found in the current field test to be unacceptable for program use and (2) the A-82 strain might abruptly deteriorate. The odds of these two things happening simultaneously are probably 1000 to 1 against but if this is a matter for serious concern then immediate steps should be taken to increase the level at which the O-83 is being reared. There is no possible way in which a new strain could be developed, field-tested, and placed

in mass production before January but O-83 could be reared in Methods at a level of about 100,000 flies per week, monitored biologically to insure that it continues to be of acceptable quality and used to replace Villa Flores if the latter cannot be used.

Drs. Mangan and Rubink will be going soon to Yucatan and will look for locations from which egg masses might be collected. They will carry a mobile laboratory and plan to establish some new isofemale lines. Earlier in the year populations in the peninsula appeared to be too low to provide an adequate number of egg masses for a new strain but may have now increased. If populations are now higher and if Methods technicians could provide egg masses from their established sheep pens (they have already offered to do so) it would be feasible to start the development of a new strain in the near future if my proposal for doing it in the Methods lab is accepted.

If however populations in Yucatan are so low that egg collection would be prolonged for many weeks it would not be wise to attempt the development of a new strain from that area. Instead it would be preferable to plan for the next strain to come from another country in spite of the tangle of logistical and political problems that would have to be solved before a new strain could be developed from biological material collected from Belize, Guatemala or some other country.



O. H. GRAHAM

Location/Project Leader

cc:

J. R. Johnston
R. E. Reichard
C. J. Whitten
H. E. Brown
D. V. Petersen
R. E. Lowe

Enclosure

RECEIVED JUN 22 1984
May 22 1984

Name: RALPH A. BRAM

Title: National Program Leader
Insects Affecting Man & Animals and Parasitology

Dates of Travel: May 14-18, 1984 Location: Mexico City and Tuxtla Gutierrez, Mexico

Purpose of Travel: To review progress of the operational screwworm eradication program; to review the ARS screwworm research program; and to co-chair the annual screwworm research/methods development planning meeting.

Participants/Contacts: P. Murrman, AAD, Southern Plains Area; Co-Directors of the Mexico-American Screwworm Eradication Commission; ARS Screwworm Research Project Leaders and Research Scientists from Tuxtla Gutierrez, Fargo, College Station, and Weslaco; screwworm eradication program personnel in methods development.

Highlights: Screwworm eradication continues to move positively toward the goal of establishing a barrier at the Isthmus of Tehuantepec by December 1984. ARS Research Units at Tuxtla Gutierrez and Fargo, with contributions from Weslaco and College Station, continue to address high priority research needs in the areas of: (1) strain development; (2) field ecology; (3) screwworm attractants; (4) population genetics; and (5) fundamental genetics. An increased research effort on screwworm nutrition and rearing is indicated and, as the program establishes a quarantine line to support the barrier, more information is needed on the chemical control of screwworms. Furthermore, field research in the geographical area south of the intended barrier (Central America) is necessary to characterize the ecology, genetics, and habits such as dispersal of screwworm populations which will attempt to break the barrier or may be subject to future eradication effort.

During the research/methods development meeting, the issue of whether strain development is the responsibility of research or of methods development again arose. Whereas ARS scientists feel that strain development is no longer research but is a legitimate methods development function, the screwworm eradication program managers view strain development as too technical and important to delegate to methods development. It is my opinion that strain development should be a shared activity, with ARS having technical responsibility and methods development contributing support in terms of facilities and assistance.

Dr. O. H. Graham, Screwworm Research Project Leader at Tuxtla Gutierrez, has rather firmly indicated his intention to retire at the end of this calendar year. The identification of his successor is critical to the continued effective execution of research in support of screwworm eradication.

Recommendations: (a) ARS should begin to assess the feasibility of establishing a 2 SY satellite laboratory in Central America with emphasis being given to possible locations in Costa Rica or Panama; (b) the question of strain development and the nature of shared responsibilities should be resolved with the initiation of efforts to develop the next strain; and (c) line and staff should intensify their effort to identify the next screwworm project leader at Tuxtla Gutierrez.

Special Observation: Recently, screwworm commission workers in the production plant at Tuxtla Gutierrez went out on a 48-hour strike, jeopardizing the screwworm colony as well as the orderly production schedule. ARS scientists and technicians voluntarily assisted in keeping the production plant operating, many working alternating 12-hour shifts. The co-directors of the Screwworm Commission assured me of their gratitude for this commitment by ARS personnel and will so advise our Administrator by formal correspondence.

cc: T. J. Army
D. B. Laster
D. D. King

R. F. Barnes
J. R. Johnston
P. J. Fitzgerald

K. L. Lebsack
✓ O. H. Graham
C. J. Whitten

C. H. Schmidt
H. E. Brown

prepared by
John Welch
06/09/84

SUMIDERO DISPERSAL STUDY

Approximately 600,000 screwworm flies, Cochliomyia
hominivorax Coqueral, of the A-82 strain were released on 22 May
1984 in the Parque Nacional del Sumidero near Tuxtla Gutierrez,
Chiapas, Mexico to investigate the dispersal of ground released
sterile flies in relation to canyons in the mountainous areas of
southern Mexico. Flies were transported to the field as pupae,
marked with fluorescent dyes and allowed to emerge. Releases of
flies were made from 8 sites, each site having flies marked with a
different color. Release sites were located at the crest and base
of 3 canyons and a ridge between 2 canyons. Release sites ranged
in elevation from 760-1120m above sea level.

Seventy wind oriented traps baited with swormlure 4 were
placed in the field prior to release of the flies. Twenty-four
traps were located within 3 canyons and 34 traps were located in a
line across the face of the mountain perpendicular to the canyons.
Four traps were located above the crest of the mountain in a line
parallel to the face of the mountain. Two lines of traps parallel
to the mountain face were situated in the Central Chiapanecan
Depression, approximately 1km and 3kms from the base of the moun-
tain. Traps ranged in elevation from 500-1120m above sea level.

Daily collection of trap samples was initiated on 23 May and
will continue until no marked flies are captured for 2 consecutive
days. Sorting of samples on the days of heaviest fly recovery
(25-29 May) has not been completed and statistical analysis of
data remains. Plotting of positive samples of marked flies on

maps illustrating release sites and trap locations suggest the following very preliminary observations: 1) Flies may disperse as far as 3km (males)-3.5km (females) on the day of emergence; 2) flies released near the crest disperse over the top of the mountain, down and across the face, and out into an adjacent valley; 3) flies released near the base may disperse out into an adjacent valley, and up and across the face, however, dispersal to and over the crest may be limited; 4) dispersal may be greater with the wind rather than against the wind; and 5) flies may remain viable for at least 17 days (data through today, 8 June 1984).



United States
Department of
Agriculture

Agricultural
Research
Service

Southern Region
Southern Plains Area
U.S. Livestock Insects Laboratory
P. O. Box 232
Kerrville, TX 78028

June 21, 1984

SUBJECT: Manuscript, "Screwworm," by R. O. Drummond

TO:

Dr. O. H. Graham
Supervisory Entomologist
Screwworm Research
ARS, USDA
Apartado Postal 544
Tuxtla Gutierrez, Chiapas 260-39
Mexico

A copy of the subject manuscript is enclosed for your review. You are asked to recommend revisions and changes, based on your experience and knowledge, that will improve the technical content and clarity of the manuscript. Please sign and date the review form and return it along with your comments as we must have documentation of review by peers of the author(s).

If you find you cannot review the manuscript within three weeks, please return it immediately and indicate that it has not been reviewed.

We appreciate your efforts to improve our manuscripts by your constructive criticism. Thank you for your time.

R. O. DRUMMOND
Laboratory Director

Enclosures

U.S. Bureau of Toxicology
Federal Bureau of Investigation
Washington, D.C. 20535

June 21, 1984

SUBJECT: Manuscript, "Spectroscopy," by R. G. Grimwood

TO:

Dr. G. H. Williams
Department of Chemistry
University of California
Santa Barbara, CA 93106
Santa Barbara Post Office
Santa Barbara, California 93101-9999

A copy of the manuscript is enclosed for your review. You are asked to review the manuscript and return it with your comments and suggestions. That will improve the technical content and clarity of the manuscript. Please sign and date the review form and return it along with your comments as we must have documentation of review by peers of the author(s).

If you find you cannot review the manuscript within three weeks, please return it immediately and indicate that it has not been reviewed.

We appreciate your efforts to improve our manuscripts by your constructive criticism. Thank you for your time.

U.S. Bureau of Toxicology
Federal Bureau of Investigation
Washington, D.C. 20535

Enclosure
Grimwood

MANUSCRIPT TITLE

Screwworm

* AUTHOR(S)

R. O. Drummond

REVIEWER'S NAME

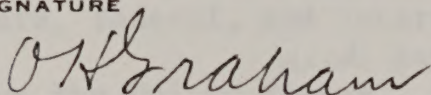
Dr. O. H. Graham

TITLE

Supervisory Entomologist

LOCATION Screwworm Research, ARS, USDA,
Tuxtla Gutierrez, Chiapas, Mexico

SIGNATURE



DATE

07/04/84

FOR PRESENTATION AT

PROPOSED PUBLISHER/JOURNAL

Chapter, 6th Edition of the Merck
Veterinary Manual

PUBLICATION RECOMMENDATION

☒ Acceptable as is☐ Acceptable
with revision☐ Unacceptable

COMMENTS (Attach additional sheets as needed)

Authors must respond to specific comments on technical content and quality, by notation
in the margin of this form or by attachment of a written response.

This summary of the screwworm problem is excellent for the intended purpose and entirely acceptable as written. Suggestions for minor changes which take into account recent eradication program progress have been handwritten on a copy of the manuscript.

SCREWORM

The screwworm is the name given to the larvae of a blow fly, Cochliomyia hominivorax (Order Diptera, family Calliphoridae), that is an obligate myiasis-causing parasite of all warm blooded animals. As a result of massive state, federal, and international programs, this costly pest has been eradicated from the United States ^{and most of Mexico.} However, it is still found in ^{southern} parts of Mexico and Central and South America.

a. Species susceptibility. The female screwworm fly lays eggs on wounds, cuts, bites, and other attractive sites in the skin of all warm blooded animals, including livestock, pets, and humans.

b. Geographic distribution. Cochliomyia hominivorax ^{was} is distributed throughout the ^{warm, humid regions} ~~Nearctic and Neotropical~~ ^{North and South America.} Regions of the ~~Western Hemisphere.~~ As a result of ~~screwworm~~ eradication programs, this species is no longer found in the United States and ^{except for Yucatan.} ~~parts of Mexico.~~ Another species of screwworm, the "old world" screwworm, Chrysomya bezziana, is found throughout the Oriental and Ethiopian Regions of the Southern Hemisphere.

c. Etiology. The bluish green screwworm fly, similar in appearance to common blow flies, deposits 200 to 400 eggs in rows that overlap like shingles in a mass on the edge of a wound. After about 12 to 24 hours, larvae hatch and crawl into the wound and burrow into the flesh. The larvae feed on the wound fluids ^{and dig deeply into} ~~and live tissue~~ ^{muscle} and complete their growth in 5 to 7 days. Grown larvae then exit from the wound and burrow into the soil to pupate. The pupal period varies from 8 days to 2 months depending on temperature. Freezing or sustained soil temperatures below 46°F (8°C) kills the pupae. The adults mate when 3 or 4

days old and gravid females are ready to oviposit at 6 days of age.' In warm weather, the life cycle may be completed in 21 days.

d. Transmission/epidemiology. Screwworm myiasis is spread by the movement of infested animals and by migration of the screwworm fly. In the United States, infestation [^]~~areas~~ were generally limited to the Southwestern States and after 1933 to the Southeastern States. During the summer months movement of infested animals and migration of flies increased the areas of infestation to states as far north as the Dakotas. Because screwworms are susceptible to cold weather, the overwintering areas in the U.S. were generally limited to southern parts of Florida, ^{and} Texas, and ~~California~~.

e. Pathogenesis. Screwworm larvae have sharp, pointed mouth hooks that tear living flesh. Infested wounds are usually filled with a malodorous, reddish brown fluid. Unless treated, infested wounds can become greatly enlarged due to multiple infestation of screwworm larvae of different ages. Older, enlarged wounds that contain dead, necrotic tissue are very attractive to a variety of flies and may become also infested with larvae of other blow flies that live on the dead and decaying flesh. Untreated infestations may ^{cause} ~~lead to~~ the death of the animal.

f. Clinical signs. Newly ^g~~infested~~ wounds contain larvae of a single age; older, larger wounds may contain screwworm larvae of various ages and often larvae of different species of blow flies. The reddish brown fluid produced in the wound usually drains from the wound and may stain the hair or wool around or below the wound.

An aid in recognizing screwworm infestation in range animals is a change in the animal's behavior. Even a small and relatively inconspicuous wound infested

with screwworms attracts not only screwworm flies, but house flies and blow flies, which seek the wound primarily to feed on the exudate and are extremely annoying to the infested animal. As the annoyance increases, the infested animal seeks protection by retreating to the densest available shade.

Massively-infested wounds increase in size and complexity and, unless treated, ^{usually result in} ~~may lead to~~ the death of the animal.

g. Lesions and/or necropsy findings. Screwworm infestations characteristically have numbers of screwworm larvae, are foul smelling, and filled with copious amounts of a brownish-red fluid.

h. Diagnosis. Screwworm flies are bluish to bluish-green, about the size of a house fly, and difficult to distinguish, except by experts, from other blow flies in the family Calliphoridae. Flies are rarely seen except for females visiting wounds. The larvae are tapered with mouth hooks at the narrow end and breathing spiracles at the wide end. Body segments are ringed with spines. Because of their shape and appearance they resemble woodscrews, hence the common name of screwworm. Screwworm larvae can be distinguished from larvae of other closely related species, especially C. macellaria, the secondary screwworm, by the fact the tracheal trunks in true screwworm larvae are darkly pigmented and can be seen thru the larval cuticle.

i. Control. Screwworms in wounds can be killed by the application of a wound dressing, called a "smear", directly to the larvae-infested wound. Such smears which contain lindane (EQ 335) (Rx) or ronnel (Rx) may be impossible to find in the U.S. because of the eradication program. Smears are best applied with a 1-in. (2.5-cm) paint brush. Careful application is necessary to be sure that the smear reaches all the many pockets formed by the burrowing larvae in

deep wounds. A thin layer should also be applied to the skin surrounding the wound to protect the wound from reinvestigation. Wounds may also be treated with aerosol, dust, or foam formulations of Co-Ral (Rx), lindane (Rx), or Korlan (Rx). As a prophylactic measure to protect animals from screwworm infestation and also to kill larvae in small, difficult-to-detect wounds, animals can be sprayed thoroughly with Korlan (Rx) or sprayed or dipped in Co-Ral (Rx).

Eradication Program: Following some 45 years of research, in 1958, the United States Department of Agriculture (USDA), in cooperation with livestock authorities and producers of the Southeastern States (especially Florida), initiated a program to eradicate screwworms from the Southeast using the sterile insect technique. At a screwworm "factory" in Sebring, Florida, millions of screwworm larvae were reared on a blood-meat diet and, 2 days before fly emergence, the pupae were exposed to gamma radiation at a dosage that caused sexual sterility but no other deleterious effects. Sterile flies were distributed over the entire screwworm-infested region (some 2000 sq miles) at the average rate of 500 male flies per square mile per week, sufficient to outnumber the native flies. The female mates only once and, when mated with a sterile male, lays eggs that do not hatch. There was a decline in the native population each generation until the native males were so outnumbered by sterile males that no fertile matings occurred and the native flies were eliminated. The last infestation in Florida was found in June 1959 and sterile-fly releases were discontinued in November. The Southeastern sterile insect program cost about \$11 million, whereas screwworms had caused an estimated \$20 million loss annually in livestock production and treatments.

In 1962 a more extensive eradication program was undertaken in the Southwestern U.S.A. where screwworms were causing an estimated \$100 million loss annually. At a screwworm "factory" at Mission, Texas, over a hundred million sterile flies were produced weekly. By the end of 1963 the size of the screwworm-infested area had been reduced by 99 percent. For the next several years, states along the Mexico border continued to become reinfested even though an artificial barrier zone along the Mexico border was established with the continual release of sterile flies.

In 1972, a joint Mexico-US agreement was signed that would allow for the eradication of screwworms from all of Mexico north and west of the Isthmus of Tehuantepec in far southern Mexico. A larger sterile fly "factory", capable of producing some ⁶⁰⁰~~500~~ million sterile flies per week was constructed in 1976 at Tuxtula Gutierrez, Chiapas, Mexico. This increased fly production plus the use of a screwworm attractant and insecticide system, called the Screwworm Adult Suppression System, that attracted and killed native screwworm flies, has allowed for the eradication of screwworms throughout Mexico down to the ^{94°W longitude}~~22nd~~ parallel. The goal is to ^{prevent the northward movement of infested animals} eradicate screwworms down to the Isthmus and there maintain a limited barrier zone. There is considerable interest in expanding the program throughout Central America with the eventual establishment of a barrier in Panama ^{and in eliminating the pest from the Caribbean islands (Screwworms were eradicated from Puerto Rico and} and [↓] *Major Selanchi in 1975).*

j. Zoonotic risk. All warm blooded animals are ~~subjected to be infested~~ ^{susceptible to infestation.} with screwworms. There have been recorded outbreaks of screwworms that involved ^{and even larger numbers of wild animals.} infestation of millions of livestock ~~(and presumably wildlife)~~. With screwworms still present in Mexico, Central America and certain islands in the Caribbean, there is a continual risk that infestations may be found again in the United

→ and fertile flies by establishing a series of quarantine stations and by blanketing the entire Isthmus of Tehuantepec with sterile flies.

→ and fertile flies by establishing a series of quarantine stations and by blanketing the entire Isthmus of Tehuantepec with sterile flies.

States. Constant vigilance by stockmen, pet owners, and others who deal with animals in the Southern U.S. is necessary to detect an infestation quickly and eradicate it before flies reproduce and spread. If a wound is found infested with larvae, appropriate samples should be collected and sent to eradication officials at P. O. Box 969, Mission, TX 78572.



United States
Department of
Agriculture

Agricultural
Research
Service

National
Program
Staff

Beltsville, Maryland
20705

June 25, 1984

SUBJECT: Response to Various Memoranda

TO: O. H. Graham
USDA, ARS
Screwworm Research
Tuxtla Gutierrez, Mexico

Thank you for the memoranda which you hand delivered at the Animal Protection Workshop. I have now had an opportunity to study them all and wish to provide a few comments as follows:

1. To R. A. Wharton (fruit fly research) - no comment.
2. To R. E. Reichard (Mr. Cano) - I, too, appreciate the helpfulness of Mr. Cano and feel that it is an excellent idea to let Dr. Reichard know of the assistance and our appreciation.
3. To H. C. Hofmann (gel diets) - I am glad to see that the Methods Development group is willing to carry out large-scale testing aspects of Dr. Harris' gel diet research. I believe that it would be scientifically advantageous for Dr. Harris to assist Methods Development in establishing the testing protocols so that, when completed, the data will be sure to complement the initial research and, if appropriate, can be published in a suitable journal. I assume that when a new scientist with expertise in insect nutrition is hired, an even greater effort on the entire topic of screwworm diet will be made.
4. To J. R. Johnston (retirement) - I sincerely regret that you will be retiring at the end of this year; however, after 45 years of dedicated service, I can certainly appreciate your desire to pursue professional and personal interests within a less structured environment. As you know, Dr. Johnston is actively pursuing the recruitment of your successor and we both hope that the individual will be onsite by October 1, 1984, in order to provide a period of orientation before your departure. Please be so kind as to let me know your firm schedule for completion of the handbook as soon as it is established; I need to reserve a block of 2-3 weeks to update or, perhaps, even rewrite the chapter on Arthropod-borne Animal Disease Transmission. There will also be some modification to illustrations.
5. To R. A. Bram (sterile fly dispersal) - The results of Dr. Welch's research on sterile fly dispersal are most interesting but, of course, add some measure of uncertainty to the question of fly dispersal in tropical areas - is the variation between Brenner and Welch conclusions the result of strain differences, environmental differences, or other factors? Nevertheless, the study is extremely important and the data on properly used swormlure and longevity of the A-82 strain most encouraging.
6. To R. A. Bram (fly security) - It is disconcerting that the "outside" committee on fly security provided two reports, one in Spanish and the other in English, that differed in their conclusions. However, we must keep in mind that this committee only provided recommendations to the Screwworm Commission Co-directors and that, at this stage, the reports are in no way binding. Your memorandum on this subject is the first step in sensitizing Dr. Reichard to inaccuracies in the Spanish report while assuring the Screwworm Commission that ARS could not be more conscious of the responsibility to maintain absolute, but

1937

June 22, 1937

Dear Mr. [Name]

Dear Mr. [Name]

Dear Mr. [Name]

Dear Mr. [Name]

I am very sorry to hear that you are not well. I hope you will get better soon.

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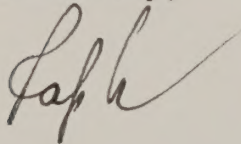
reasonably implemented, security. The next step is to keep appropriate Commission personnel apprised of the status of the ARS security effort with justified recommendations for the best procedures. I would suggest that Dr. Reichard be your primary contact but, certainly, Drs. Novey and Hofmann must also be kept fully informed. I will maintain a continuing dialogue on this subject with Dr. Smith and Mr. Sudlow. Perhaps your next communication with Dr. Reichard should include an itemized account of the costs which are required to modify the ARS facilities in order to assure proper security. Some items should be implemented during FY 84.

7. To R. A. Bram (strain development) - As we briefly discussed at the Animal Protection Workshop, your main concern to the continued ARS responsibility for strain development is the total disruption of more fundamental, long-term research for a 6-month period every year. It is my understanding that last week representatives of the Screwworm Commission met with ARS scientists at Tuxtla Gutierrez to discuss this very issue. The results seem to be a compromise proposal in which only the first crosses will be made in the ARS facility and subsequent crosses and increase in lines will then be accomplished in the Methods Development facilities. Although this compromise would limit the more fundamental genetic research to some degree, it would not require terminating all other research for a 6-month period as before. I would encourage you to favorably consider this compromise proposal and, as necessary, work out details with Drs. Novey and Hofmann. In the near future, Dr. Reichard will be sending you a formal request to begin development of the next strain, and I am convinced that the APHIS officials will work with you to make sure that disruption of more fundamental research will be minimized. I have been advised that screwworm populations in at least some areas of Yucatan are now very high and that the probability for obtaining sufficient numbers of egg masses in reasonably short time is good.

On a related matter, I understand that there is some concern that research in Mexico will fall under the responsibility of ARS International Programs. I have been assured that, although for accounting and budget purposes, screwworm research in Mexico will use an international code, from a programmatic management standpoint, screwworm research will stay just as it is now both on NPS and in the Southern Plains Area.

Best regards.

Sincerely,



RALPH A. BRAM
National Program Leader
Insects Affecting Man & Animals
and Parasitology

cc:

J. R. Johnston

R. E. Reichard

reasonably implemented, security. The next step is to keep appropriate Commission personnel apprised of the status of the ARS security effort with justified recommendations for the best procedures. I would suggest that Dr. Weichard be your primary contact but, certainly, Drs. Novy and Holman must also be kept fully informed. I will maintain a continuing dialogue on this subject with Dr. Smith and Mr. Sudlow. Perhaps your next communication with Dr. Reichard should include an itemized account of the costs which are required to modify the ARS facilities in order to assure proper security. Some items should be implemented during FY 64.

7. To S. A. Bram (strain development) - As we briefly discussed at the Animal Protection Workshop, your main concern is the continued ARS responsibility for strain development as the total duration of more fundamental, long-term research for a 6-month period every year. It is my understanding that last week representatives of the Government Commission met with ARS scientists at Tuxtepec to discuss this very issue. The results seem to be a compromise proposal in which only the first crosses will be made in the ARS facility and subsequent crosses and increases in lines will then be accomplished in the Mexico Development facilities. Although this compromise would limit the more fundamental genetic research to some degree, it would not require eliminating all other research for a 6-month period as before. I would encourage you to favorably consider this compromise proposal and, as necessary, work out details with Drs. Novy and Holman. In the near future, Dr. Reichard will be sending you a formal request to begin development of the next strain, and I am convinced that the ARS officials will work with you to make sure that distribution of more fundamental research will be maintained. I have been advised that the population in at least some areas of Yucatan are now very high and that the possibility for obtaining sufficient numbers of egg masses is reasonably short time is good.

On a related matter, I understand that there is some concern that research in Mexico will fall under the responsibility of ARS International Programs. I have been assured that, although for accounting and budget purposes, scientists research in Mexico will use an international code, from a programmatic management standpoint, scientists research will stay just as it is now both on WPS and in the Southern Plains Area.

Best regards,

Sincerely,

RALPH A. BRAM
National Program Leader
Insects Affecting Man & Animals
and Parasitology

cc: J. R. Johnston
E. E. Reichard



COMISION MEXICO-AMERICANA PARA LA ERRADICACION DEL GUSANO BARRENADOR.

LA ENERGIA ATOMICA AL SERVICIO DEL BANADERO

COMTA. 24363

KM. 2 CARRETERA A LA ANGOSTURA

APDO. POSTAL 544

CHIAPA DE CORZO, CHIS.

MINUTA DE LA JUNTA EXTRAORDINARIA DEL COMITE DE SEGURIDAD
BIOLOGICA DE LA PLANTA.

HORA: 9:00 Hrs.

FECHA: 27 de junio de 1984.

Se convocó a reunión extraordinaria con el fin de fijar los lineamientos a seguir para respaldar los métodos de seguridad biológica.

A: Sub'Directores de Producción.
Jefes de Departamento.
Comité de Seguridad.

Asistentes: Dr. Luis Hernández, Dr. Manuel Aguirre, Dr. Manuel Chávez, Lic. Herminio Chanona P. El Dr. Luis Hernández con la representación del Dr. Agustín Pagaza G. y C.P. Mario A. de la Garza.

M I N U T A :

A las 9:20 Hrs. se acordó iniciar.

Se analizó la situación que no existe el documento bajo el cual se apoyará y reglamentará la seguridad biológica, sin embargo, coincidieron los presentes en que se debe instrumentar la sensibilización y concientización de todo el personal, para que en su momento de existir el Manual, sea menos difícil el aplicarlo.

Se conminó a tener mayor responsabilidad y atención respecto a seguridad biológica y su Comité, así como se pidió verificar los canales de aviso para la reunión, y en caso de haber sido recibida, que emane una severa llamada de atención por parte de la Sub'Dirección de Producción (ambas secciones); con el fin de que se le dé la importancia que el caso reviste.

Queda pendiente la fecha de la siguiente reunión.

Chiapa de Corzo, Chis., a 27 de junio de 1984.

cc - Comité de Seguridad.
Sub'Directores Generales.
Sub'Directores de Producción.
Jefes de Departamento Planta.
Arch/Consec.

USDA-ARS SCREWORM RESEARCH
APARTADO POSTAL #544
TUXTLA GUTIERREZ, CHIAPAS MEXICO

02 / julio / 84

Espinosa E

